

POSTER PRESENTATION

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Myocardial perfusion 3-Tesla cardiac magnetic resonance vs. exercise electrocardiogram for diagnostics of coronary artery disease

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Introduction

Myocardial perfusion cardiac magnetic resonance imaging (MRI) is established as a high sensitive procedure to diagnose coronary artery disease (CAD). In practice exercise electrocardiogram (XECG) is widely used as non invasive method to detect relevant coronary stenosis (>50%).

The aim of this study was to investigate the diagnostic performance of adenosin stress 3-Tesla cardiac MRI for verification of ischaemia at coronary artery disease in comparison to XECG referred to coronary angiography as gold standard.

Methods

We included patients who received XECG, stress cardiac MRI and accomplished invasive coronary diagnostics. The MRI measurements at 3.0 T based on cine-mode-sequences in short axes images, rest and adenosin stress (140 µg/kg bw/min) perfusion and late gadolinium enhancement imaging (LGE, Magnevist 0,2mmol/kg bw). Myocardial ischemia was defined as an area of perfusion deficit at stress MRI with negative late enhancement in areas of hypoperfusion (Panels A and B).

XECG was carried out on bicycle ergometer with a standardised protocol.

Results

40 patients (63±11 years) were analysed prospectively, ten patients were assumed to have CAD, 30 had known CAD and were supposed to have a progress. A myocardial infarction in history was known at 14 patients,

XECG showed pathological findings in 24 cases (60%), twelve of these had angina or severe dyspnea, eleven

patients had significant horizontal or down sloping ST-depression, one patient had an unsustained ventricular tachycardia.

Coronary angiography investigated a significant CAD (stenosis ≥50%) at 30 patients.

10 with normal XECG had relevant CAD. Sensitivity of XECG was 67%, specificity 60%. The positive predictive value (PPV) was calculated with 83%, the negative predictive value (NPV) was 37%.

Adenosin stress cardiac MRI revealed perfusion deficits in 32 patients (80%). The sensitivity of MRI concerning coronary stenosis ≥50% was 93%, the specificity 60%. Two patients with inconspicuous adenosin stress cardiac MRI had significant CAD. The PPV of MRI was 88%, the NPV 75%. All 14 patients with prior myocardial infarction were detected by LGE-sequence (both sensitivity and specificity 100%).

Conclusion

Myocardial perfusion magnetic resonance imaging at 3.0 Tesla is superior to exercise electrocardiogram to diagnose relevant (stenosis ≥50%) coronary artery disease. Cardiac MRI could also demarcate all patients with prior myocardial infarction by late enhancement.

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